428.45 2 **Dart Aerospace Ltd.**

ay, 19/03/2009 4:30:57 PM
rson

Process Sheet

: CU-DAR001 Dart Helicopters Services
ber : 46617
nate Number : 12578
P.O. Number :
This Issue : 19/03/2009 S.O. No. :
Prsht Rev. : NC
First Issue : / / Type : MACHINED PARTS
Previous Run : 44471
Written By :
Checked & Approved By : JY09.03.19
Comment : Est Rev:A New Issue 07.05.24 EC
est rev B ECN 987 07.10.09 EC verified by: DD
Est Rev:C ECN1048 07-12-18 DD verified by: EC

Drawing Name : ARM
Part Number : D3560041
Drawing Number : D3560 REV D
Project Number : N/A
Drawing Revision : D
Material :
Due Date : 03/04/2009 Qty: 4 Um: Each

Additional Product

Job Number:

Seq. #:	Machine Or Operation:	Description :
1.0	M6061T6B0500X05000	6061-T6 Bar .500 x 5.00

Comment: Qty.: 1.4648 f(s)/Unit Total : 11.7180 f(s)
6061-T6 Bar 0.50" x 5.00" 6061T6 .500 x 6.00
Batch: M111321 09/04/02

2.0	BAND SAW	BAND SAW

Comment: BAND SAW
Cut blanks 16.750" long 09/04/02

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1

Ph

Comment: HAAS CNC VERTICAL MACHINING #1

1- Mill as per Folio FA693 Rev: B & Dwg D3560 Rev: D

2-C'sink 0.196" hole on manual mill as per dwg D3560

3-Deburr per dwg D3560 09/04/05 / SP 09/04/05

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE

Comment: INSPECT PARTS AS THEY COME OFF MACHINE 09/04/05 / SP 09/04/05

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: D3560-041 **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes (No) **DQA:** L **Date:** 09/04/30

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR: 46617		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B: **Initial** Chief Eng	**Action Description** Chief Eng	**Sign & Date**	**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
09.04.07	3	Ø0.507 PIVOT HOLE IS 0.508 ON Qty (4). Ø0.508 BUSHING HOLE IS 0.505.	09.04.07 per QSI 042	Acceptable. Update CNC prog to add additional pass to reduce tool deflection.	09.04.30	09/04/30	09.04.07 per QSI 042	09/04/30
09.04.08	3.0	Upper pockets were machined too thick. Ranges from 0.208" → 0.213" thick. R C: Origin to high; employee in training.	QSI 042	Parts are acceptable. Have material ↓ is stronger. Ensure to measure 1st part, upon noticing the measurment re-do origin to better conform			QSI 042	09.04.09

NOTE: Date & initial all entries

Date: Thursday, 19/03/2009 4:30:57 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** ARM

Job Number: 46617 **Part Number:** D3560041

Job Number:

Seq. #:	Machine Or Operation:	Description :
5.0	QC8	SECOND CHECK

Comment: SECOND CHECK N A 09/04/08

6.0	D35921	Plate

Comment: Qty.: 1.0000 Each(s)/Unit Total : 8.0000 Each(s)
PLATE
Batch: 346891 09.04.294

7.0	LARGE FAB 1	LARGE FABRICATION RESOURCE 1

Comment: LARGE FABRICATION RESOURCE 1

1-Weld assembly as per dwg D3560

STEP:
1- clean material (buff bracket and bottom of arm with blue pad)
2- set up bracket and arm on jig
3- preheat bracket and arm with torch
4- clean before welding with brush
5- set up machine to 135 amps
6- weld across bottom and top ends
7- reheat with torch (65 deg C)
8- on one side weld from bottom to top half way
9- same for other side (half way)
10- from half way point weld the rest of the first side (ease off pedal near end)
11- same for remaining side (ease off pedal near end)

09.04.294 (041)

8.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP 09/04/30 (KB)

9.0	QC9	VISUAL WELDING INSPECTION

Comment: VISUAL WELDING INSPECTION PD 09-04-30 (41)

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Thursday, 19/03/2009 4:30:58 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** ARM

Job Number: 46617 **Part Number:** D3560041

Job Number:

Seq. #:	Machine Or Operation:	Description :
10.0	HAND FINISHING1	HAND FINISHING RESOURCE #1

Comment: HAND FINISHING RESOURCE #1
Chemical Conversion Coat as per QSI 005 4.1

BR 09-04-30 (4)

11.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

FZ 09/04/30 (4)

12.0	D2808	Bushing

Comment: Qty.: 1.0000 Each(s)/Unit Total : 8.0000 Each(s)
Spacer
batch: B41708

EJS 09/04/30

13.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1

Comment: SMALL & MEDIUM FAB RESOURCE 1
1-Press bushing in D3560 arm per dwg D3562

EJS 09/04/30 (4)

14.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP

(-041)
S 09/04/30 (XY)

15.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Identify and Stock
Location: PAT E

SS 09/04/30 (XY)

16.0	QC21	FINAL INSPECTION/W/O RELEASE

Comment: FINAL INSPECTION/W/O RELEASE

09/04/01

Job Completion

MF 09-04-30

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	46667
Description: Arm	Part Number:	D3560-1
Inspection Dwg: D3560 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [ ] Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø0.507	+0.000/-0.001	.507	✓			
Ø0.196	+0.005/-0.001	.196	✓			
Ø1.000	+0.010/-0.001	1.000	✓			
0.500	+/-0.010	.500	✓			
0.250	+/-0.010	.250	✓			
0.275	+/-0.010	.275	✓			
0.188	+/-0.010	.188	✓			
2.000	+/-0.010	2.000	✓			
1.700	+/-0.010	1.700	✓			
Ø0.385 x 100°	+/-0.010 x 0.5°	Ø.385±100°	✓			
0.250 Deep	+/-0.010	.245	✓			

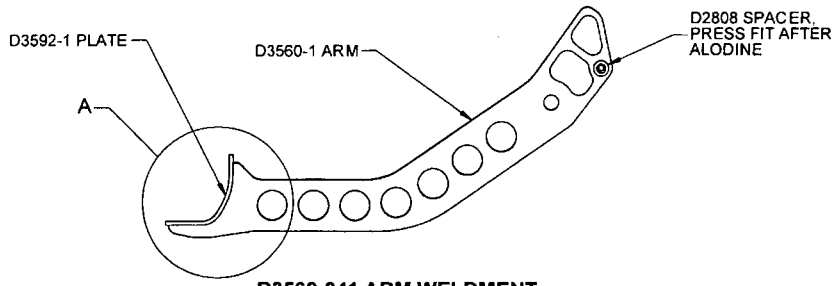
Measured by:	SP
Date:	09/04/08

Audited by:	B.A
Date:	09/04/08

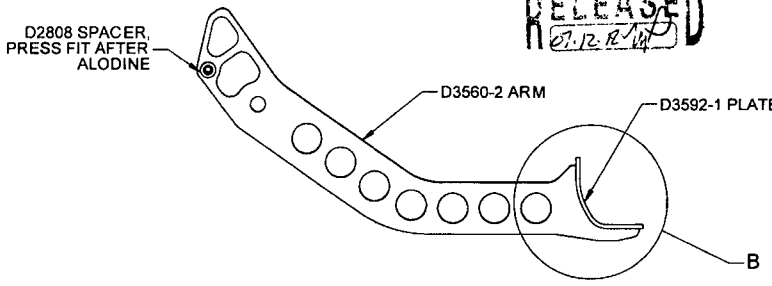
Prototype Approval:	N/A
Date:	N/A

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue P/O D3560-041	KJ/JLM	
B	07.06.13	Dimensions updated per Dwg Rev B	KJ/JLM	
C	08.07.24	Dwg Rev updated	KJ/DD	

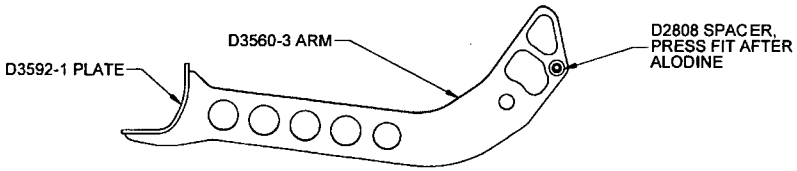
RELEASED
07.12.16



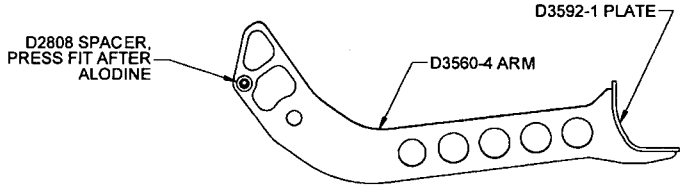
D3560-041 ARM WELDMENT



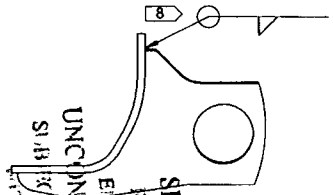
D3560-042 ARM WELDMENT



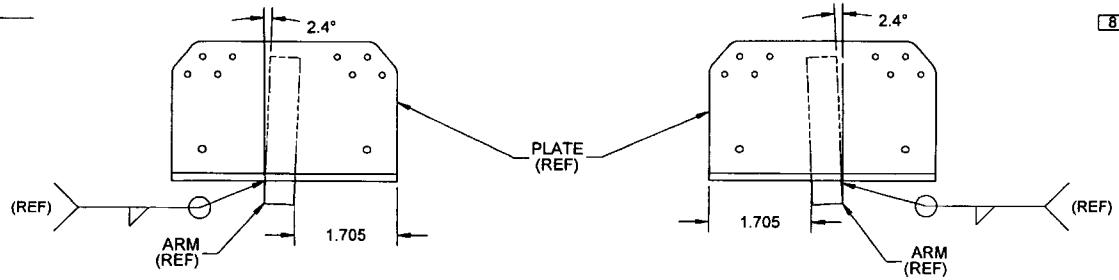
D3560-043 ARM WELDMENT

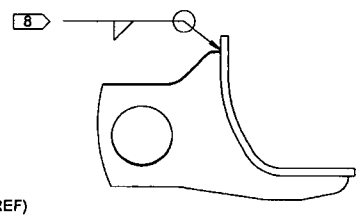


D3560-044 ARM WELDMENT



DETAIL A
SCALE 1 : 2





DETAIL B
SCALE 1 : 2

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BEGINNING OF WORK ORDER
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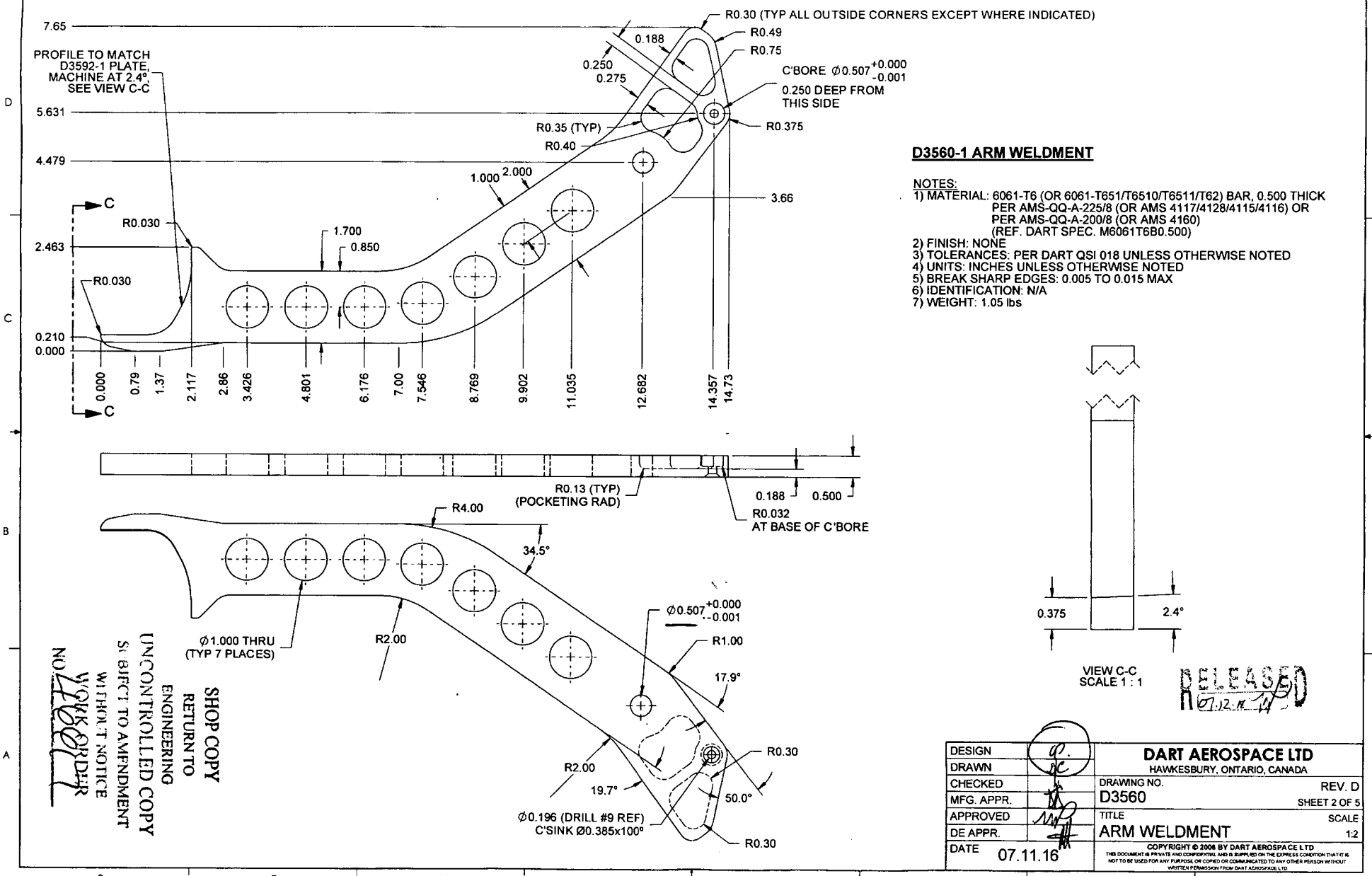
PARTS LIST

QTY -041	QTY -042	QTY -043	QTY -044	P/N	DESCRIPTION
X				D3560-041	ARM WELDMENT
	X			D3560-042	ARM WELDMENT
		X		D3560-043	ARM WELDMENT
			X	D3560-044	ARM WELDMENT
1	1	1	1	D2808	SPACER
1				D3560-1	ARM
	1			D3560-2	ARM
		1		D3560-3	ARM
			1	D3560-4	ARM
1	1	1	1	D3592-1	PLATE

NOTES:
1) MATERIAL: N/A
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.23 lbs (TYP)
8) WELDING: PER DART QSI 004

REV.	DESCRIPTION	BY	DATE
D	ADD D2808 PRESS FIT NOTE; REDRAWN IN SOLIDWORKS	DC	07.11.16
C	REMOVE POWDER COAT	CP	07.06.19
B	REDESIGN AS WELDMENT, ADD POCKETS	CP	07.01.15
A	NEW ISSUE	CP	06.09.25

DESIGN	DART AEROSPACE LTD	
DRAWN	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DRAWING NO. D3560	REV. D
MFG. APPR.		SHEET 1 OF 5
APPROVED	TITLE ARM WELDMENT	SCALE 1:4
DE APPR.		
DATE 07.11.16		



D3560-1 ARM WELDMENT

NOTES:
1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR PER AMS-QQ-A-200/8 (OR AMS 4160) (REF. DART SPEC. M6061T6B0.500)
2) FINISH: NONE
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.05 lbs

VIEW C-C
SCALE 1 : 1

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07.12.16

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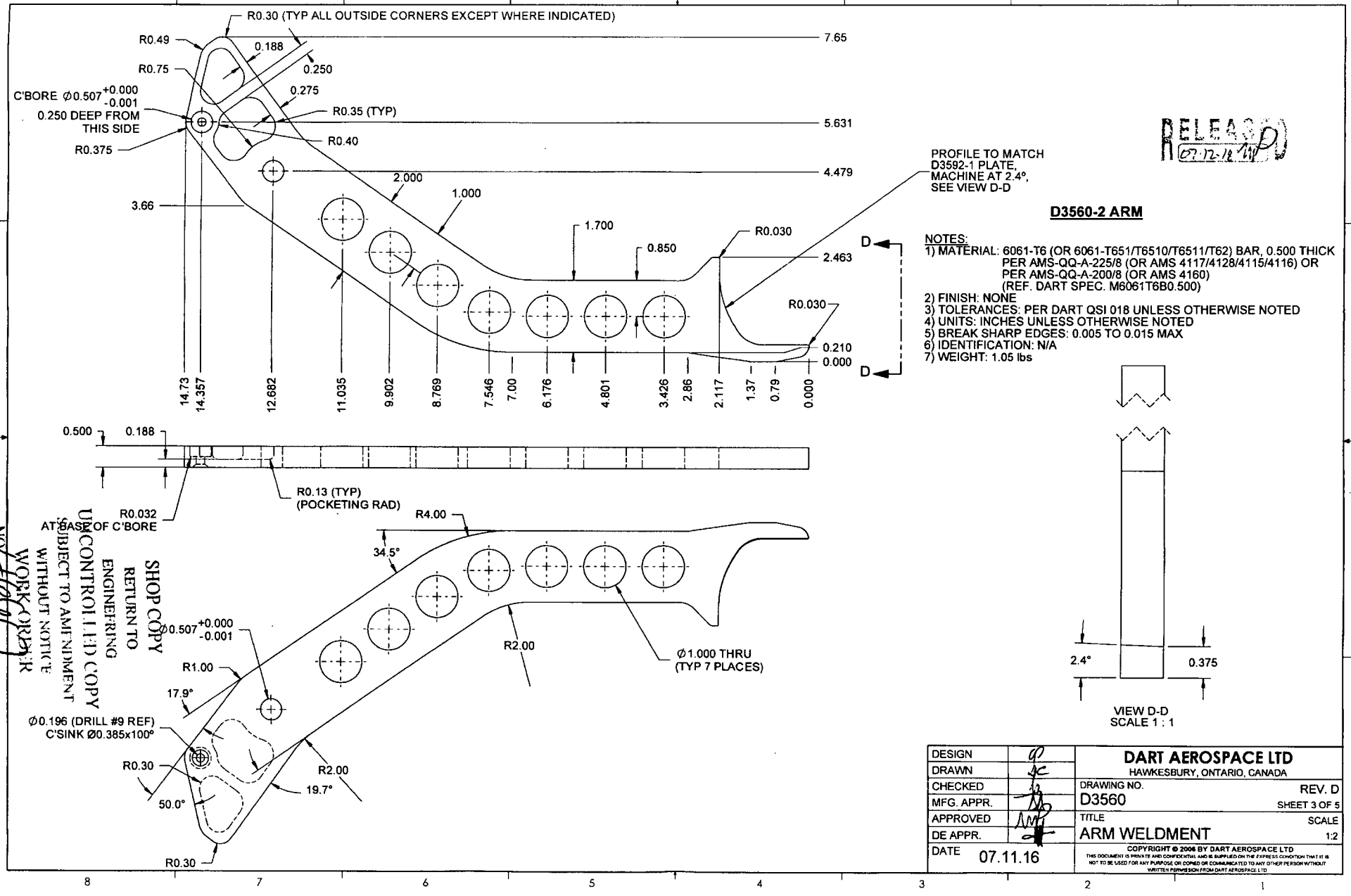
WORK ORDER
NON

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO. D3560	REV. D
MFG. APPR.			SHEET 2 OF 5
APPROVED		TITLE ARM WELDMENT	SCALE 1:2
DE APPR.			
DATE 07.11.16			



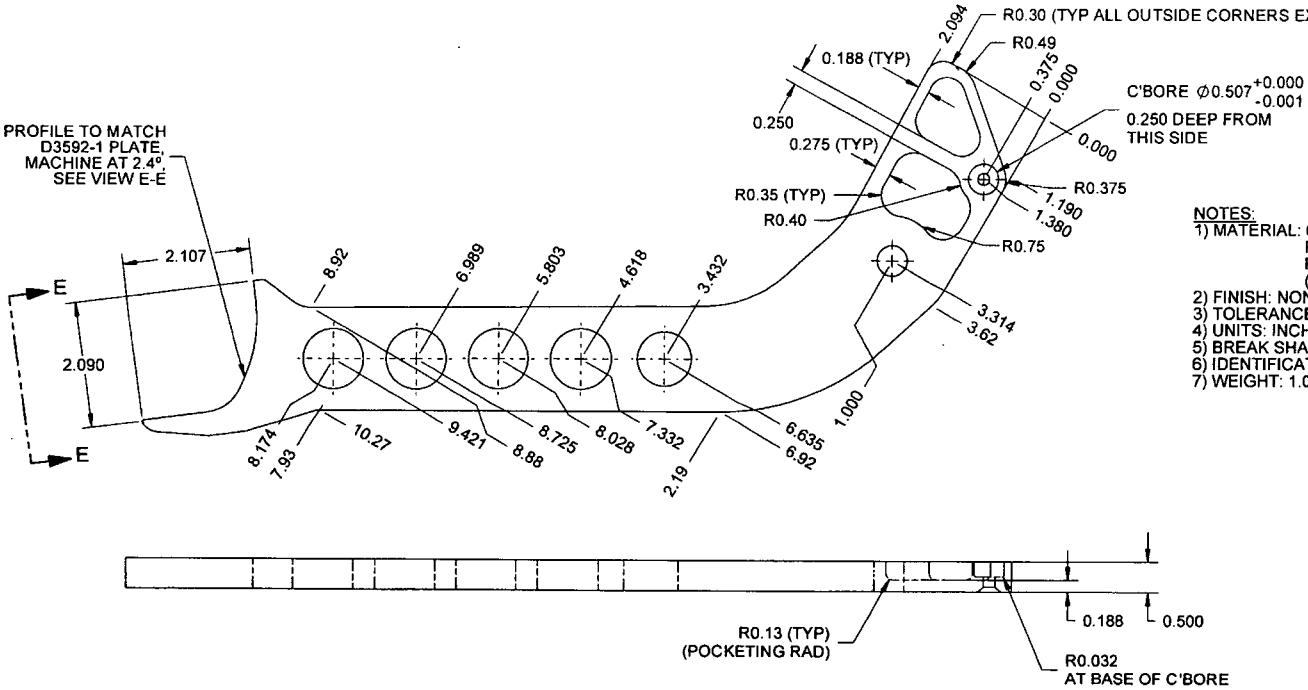
RELEASED 07-12-12

D3560-2 ARM

NOTES:
1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR PER AMS-QQ-A-200/8 (OR AMS 4160) (REF. DART SPEC. M6061T6B0.500)
2) FINISH: NONE
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.05 lbs

VIEW D-D
SCALE 1 : 1

DESIGN		DART AEROSPACE LTD
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. D3560 — REV. D — SHEET 3 OF 5
MFG. APPR.		TITLE: ARM WELDMENT — SCALE 1:2
APPROVED		
DE APPR.		
DATE 07.11.16		



VIEW E-E
SCALE 1 : 1

D3560-3 ARM

NOTES:
1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR
PER AMS-QQ-A-200/8 (OR AMS 4160)
(REF. DART SPEC. M6061T6B0.500)
2) FINISH: NONE
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.05 lbs

RELEASED
07.12.16

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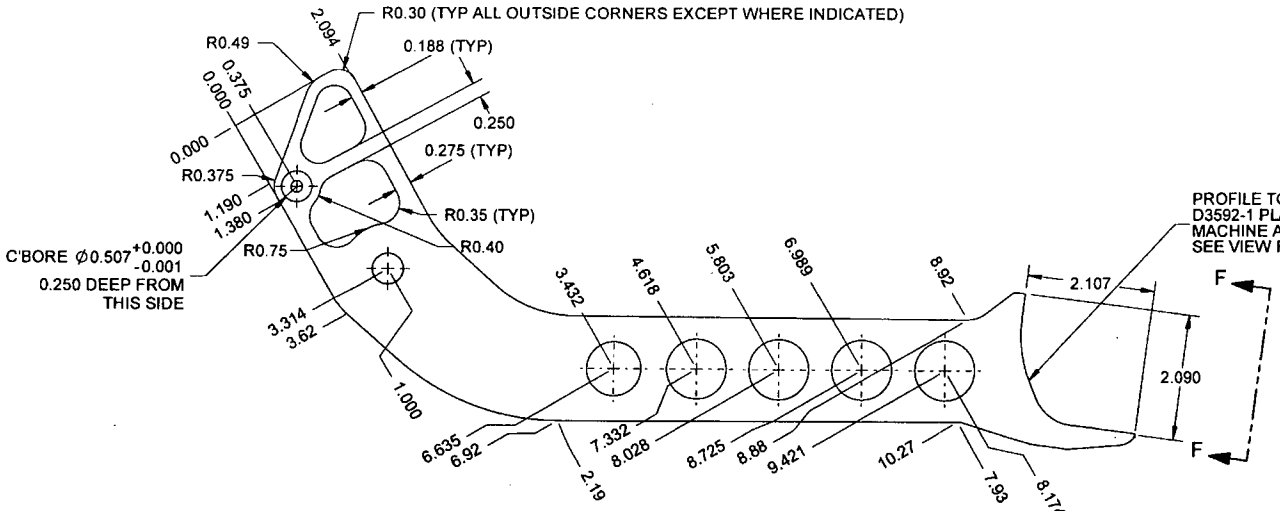
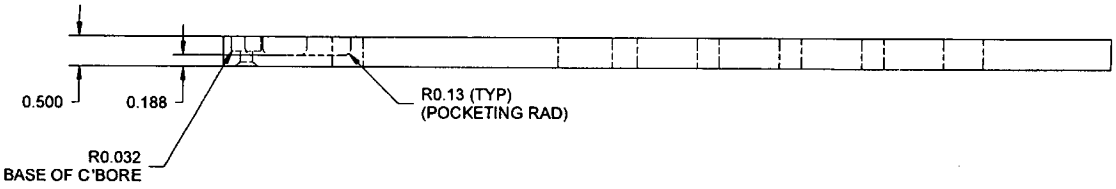
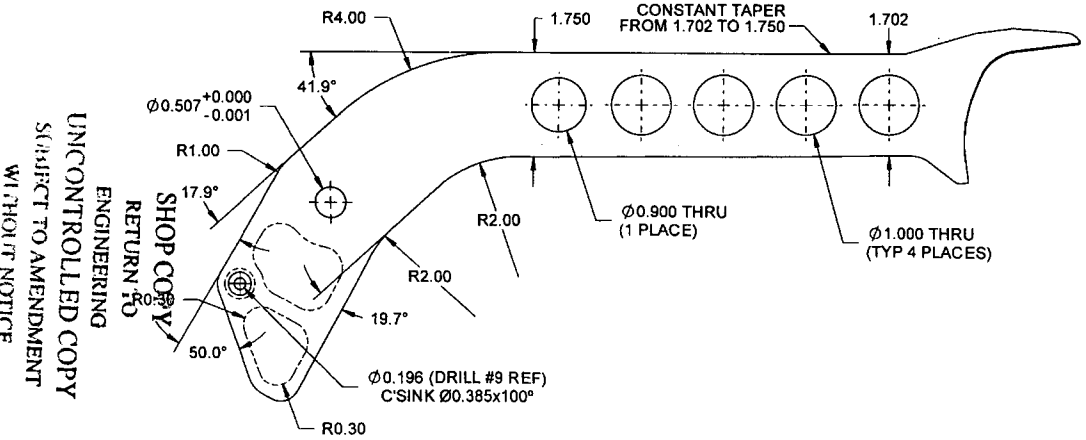
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO. D3560	REV. D
MFG. APPR.			SHEET 4 OF 5
APPROVED		TITLE ARM WELDMENT	SCALE 1:2
DE APPR.			
DATE 07.11.16			







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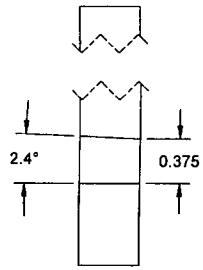
WORK ORDER
NO.

D3560-4 ARM

NOTES:
1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR PER AMS-QQ-A-200/8 (OR AMS 4160) (REF. DART SPEC. M6061T6B0.500)
2) FINISH: NONE
3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
4) UNITS: INCHES UNLESS OTHERWISE NOTED
5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
6) IDENTIFICATION: N/A
7) WEIGHT: 1.05 lbs



VIEW F-F
SCALE 1 : 1

RELEASED
07-12-18

DESIGN		DART AEROSPACE LTD
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. D3560 REV. D
MFG. APPR.		SHEET 5 OF 5
APPROVED		TITLE ARM WELDMENT SCALE 1:2
DE APPR.		
DATE 07.11.16		

Chris Provencal

From: David Shepherd [dshepherd@dartaero.com]
Sent: April 7, 2009 1:28 AM
To: 'Chris Provencal'
Subject: RE: NCR D3560-041

Chris,

I do not recall why we have such a tight tolerance on this hole.
My take on this is that the deviated parts that you mention below are acceptable.

David

From: Chris Provencal [mailto:cprovencal@dartaero.com]
Sent: Monday, April 06, 2009 11:35 AM
To: 'David'
Subject: NCR D3560-041

Qty(7) D3560-041 Arm (for D412-630 steps). The hole for the pivot is 0.508 dia (0.001 over tol). From one side of the hole to the other, the holes basically taper from 0.505 (min) to 0.508 (max) due to tool deflection. Although this is small, the arm was certified by test and this is the location of the highest stress in the part, so I can't validate the deviation. An AN8 bolt is installed through this hole. What is your engineering judgement?

Sincerely,
Christopher Provencal
DART Aerospace Ltd.

cprovencal@dartaero.com
Tel: (613) 632 5200
Fax: (613) 632 9311